

FIG. 1

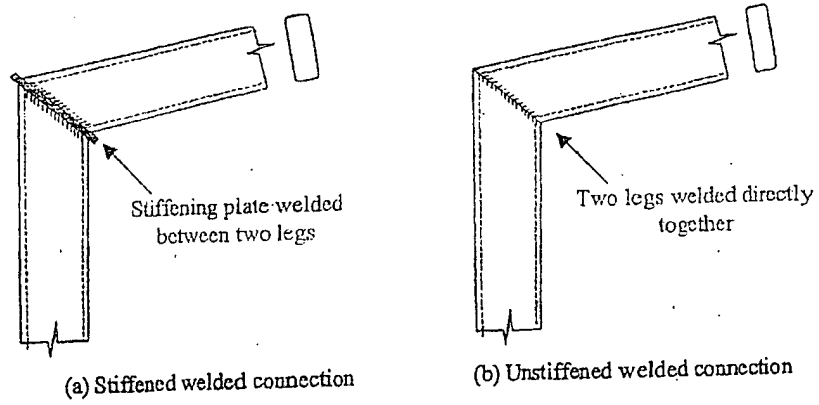


FIG. 2

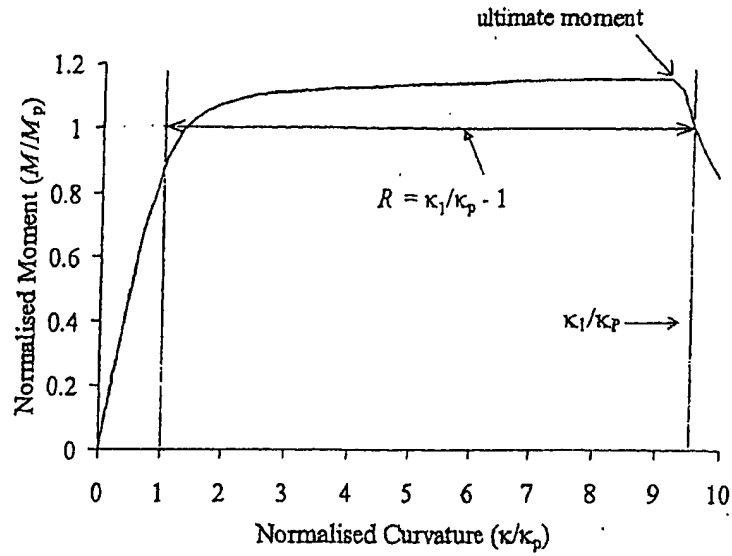


FIG. 3

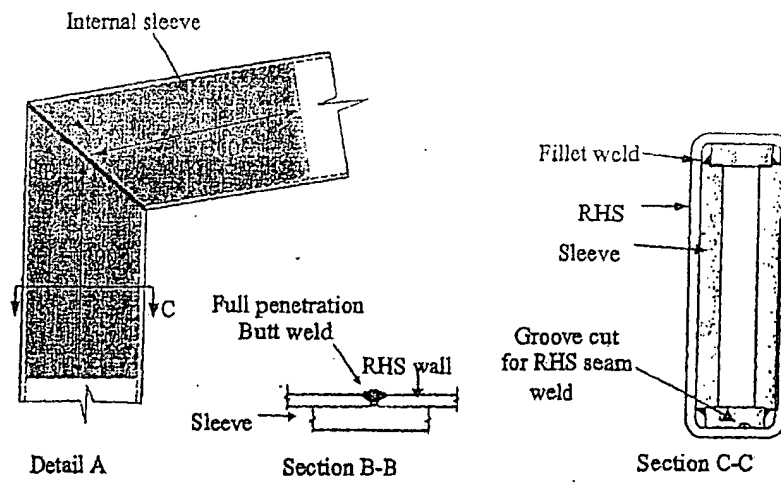
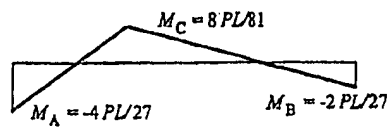
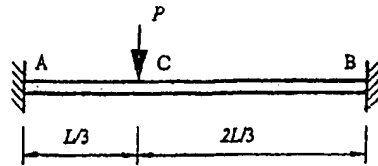
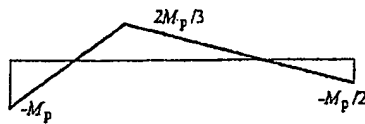


FIG. 4



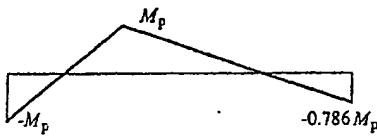
Elastic moment distribution



Hinge forms at A

$$P = 6.75 M_p/L$$

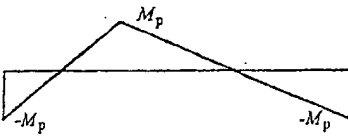
$$\theta_A = 0$$



Hinge forms at C

$$P = 8.68 M_p/L$$

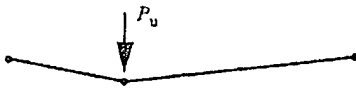
$$\theta_A = \frac{M_p L}{14EI}$$



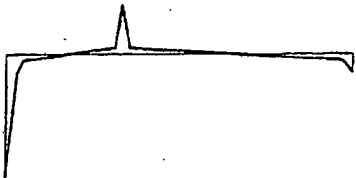
Hinge forms at B

$$P = 9 M_p/L$$

$$\theta_A = \frac{M_p L}{6EI}$$



Plastic collapse mechanism



Curvature distribution at collapse

FIG. 6

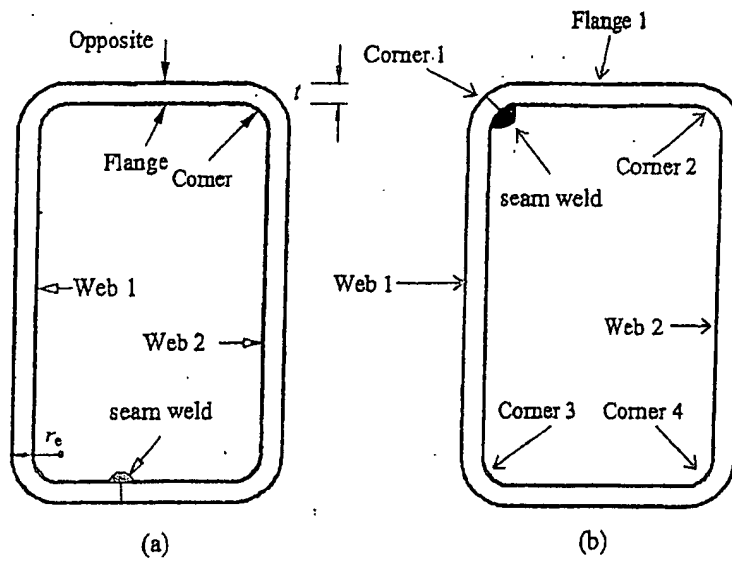


FIG. 5

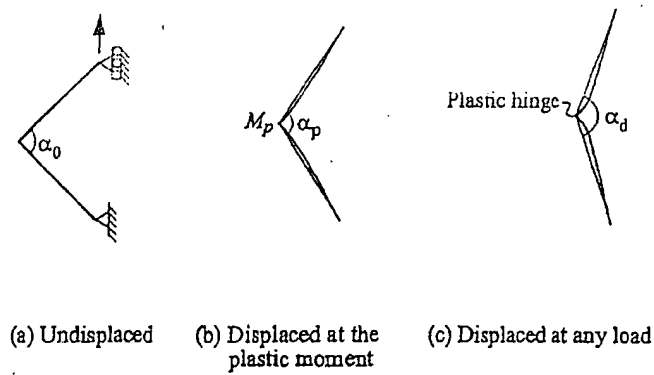
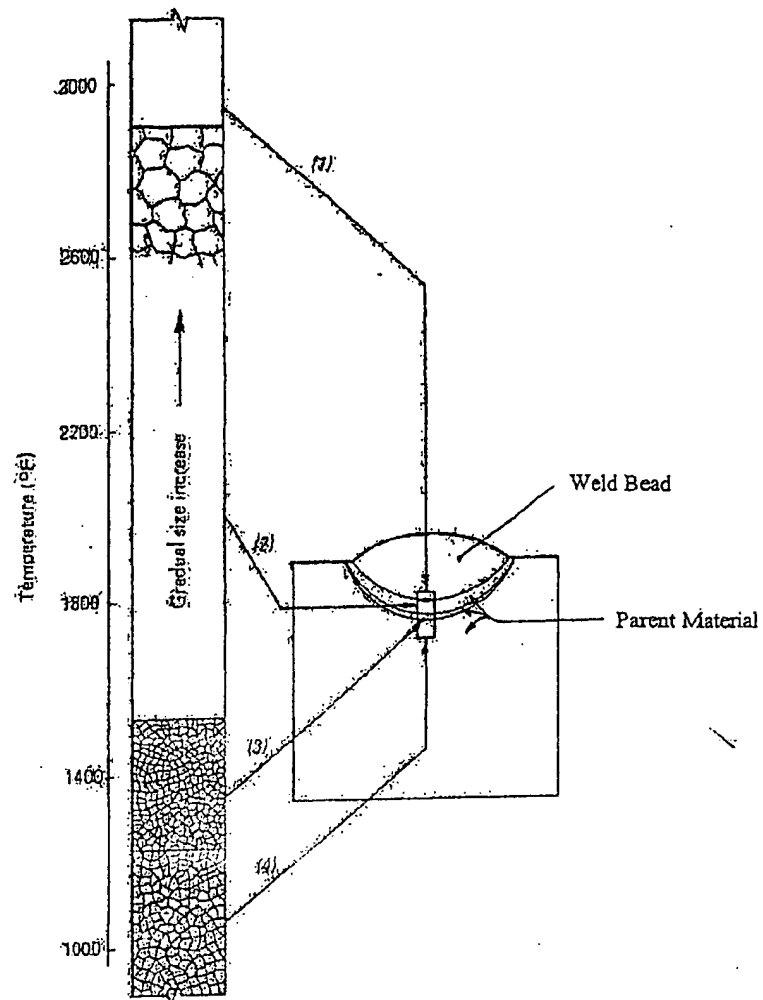


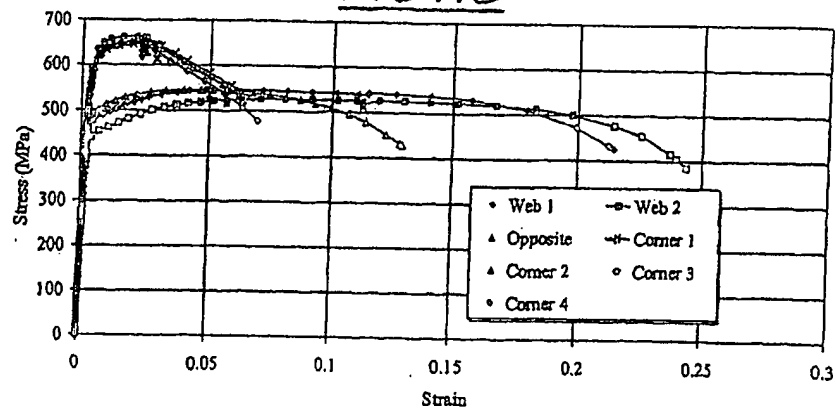
FIG. 7



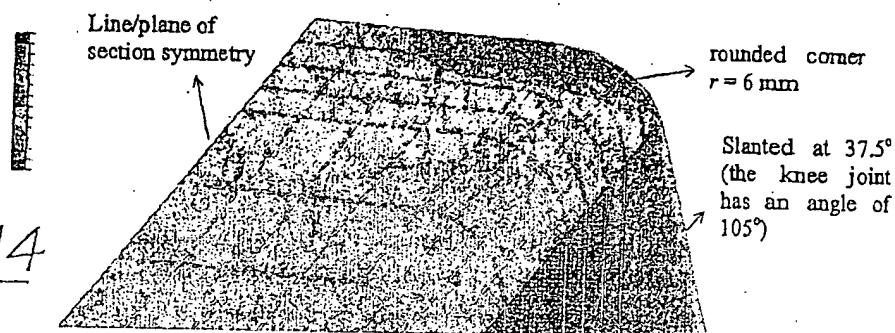
Effects of welding on grain sizes in parent material

FIG. 8



FIG.13

Typical stress-strain curves of DuraGal® C450 150×50×4

FIG.14

Strain pattern of a normally welded stiffened knee joint (Model 1), linear elastic analysis

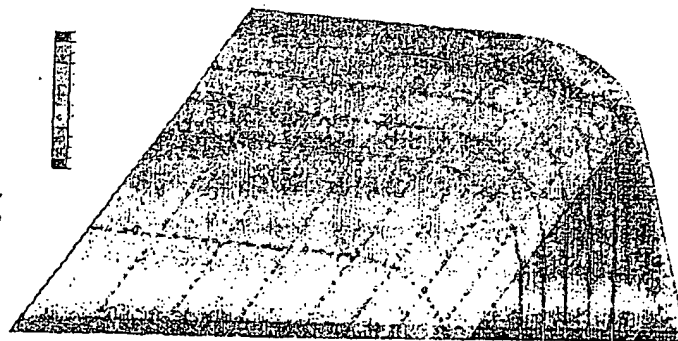
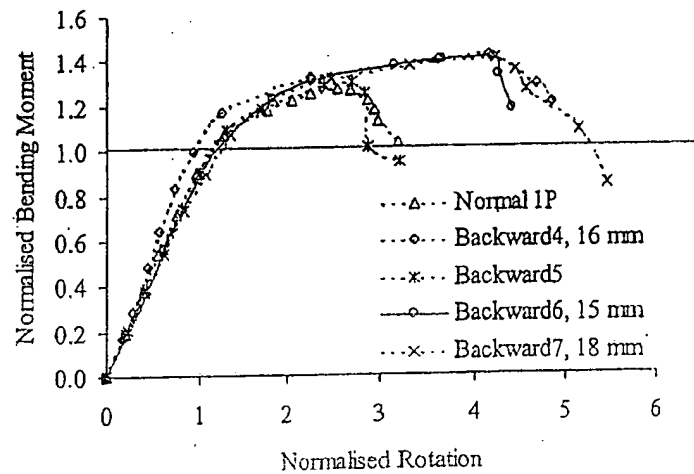
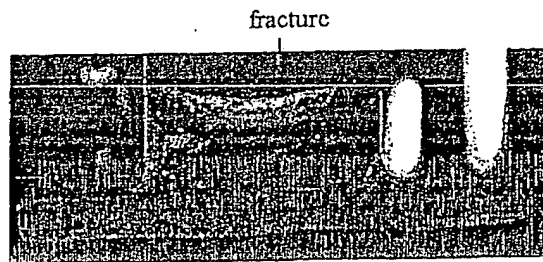
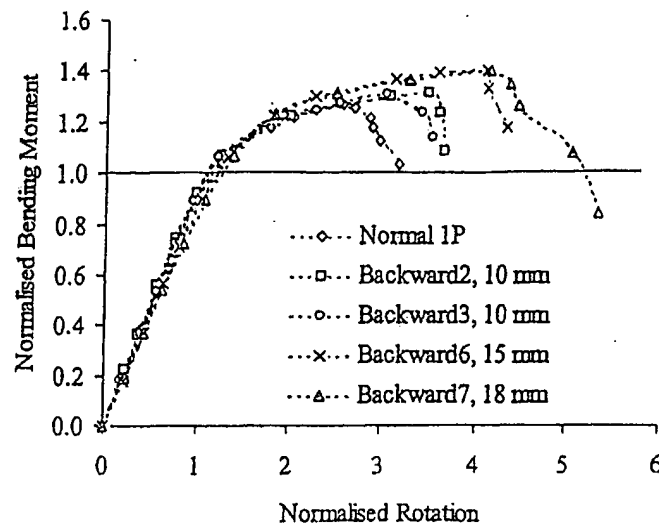
FIG.15Strain pattern of a normally welded stiffened knee joint (Model 1) at  $1.181 M_p$

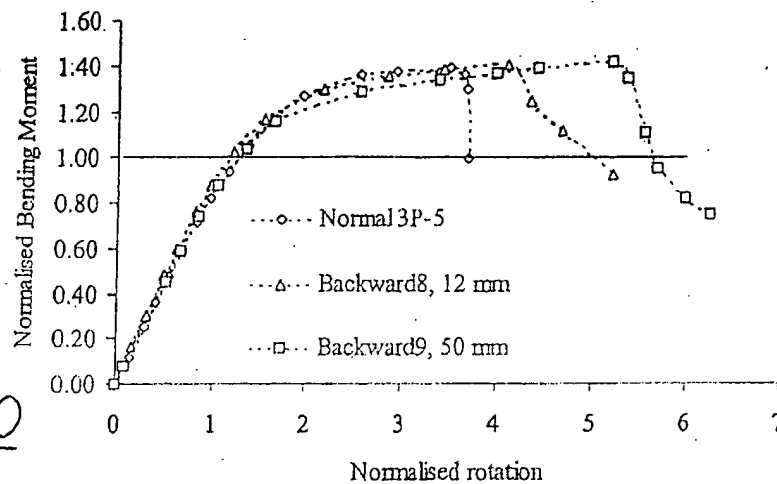
FIG. 16Strain pattern of a stiffened knee joint with extra layers of weld (Model 2) at  $1.184 M_p$ FIG. 17Moment-rotation curves of normal and "backward"  $150 \times 50 \times 4$  specimensFIG. 18

Fracture in the flange of "Backward4"

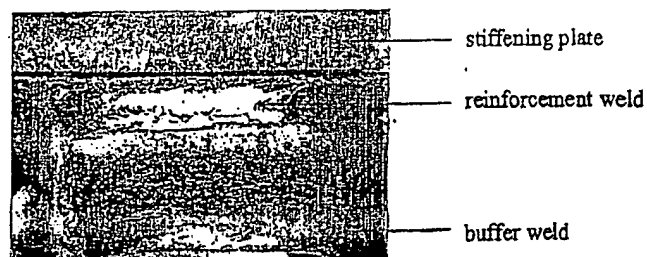


FIG. 19

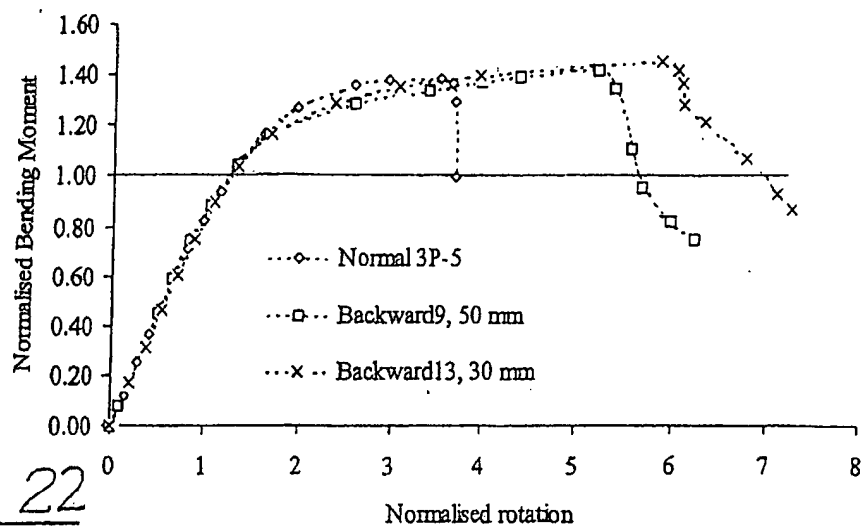
· Moment-rotation curves of  $150 \times 50 \times 4$  specimens with narrow extra layers of weld

FIG. 20

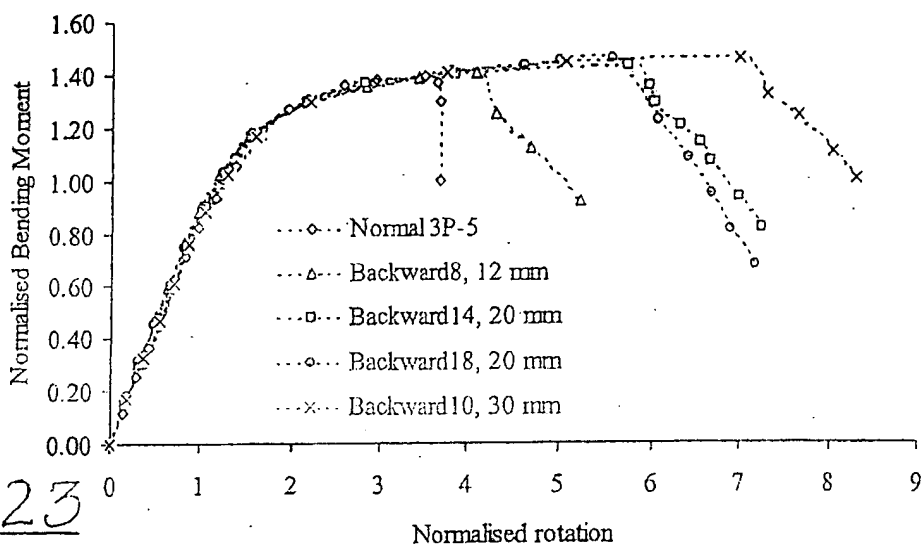
Performance of a  $150 \times 50 \times 5$  specimen with 50-mm wide extra layers of weld

FIG. 21

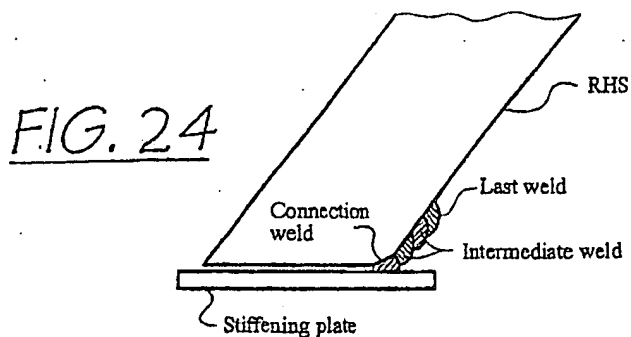
Reinforcement weld on top of the connection weld of "Backward13"



Comparison between  $150 \times 50 \times 5$  specimens with and without reinforcement weld



Comparison between  $150 \times 50 \times 5$  specimens with 12, 20 and 30 mm extra layers of weld



Stiffened knee joint with "forward" extra layers of weld

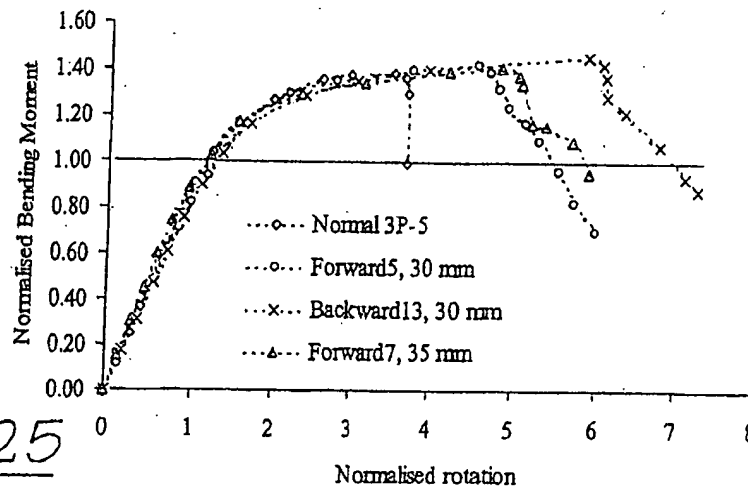


FIG. 25

Comparison of "forward" and "backward" 150×50×5 specimens (without seam weld)

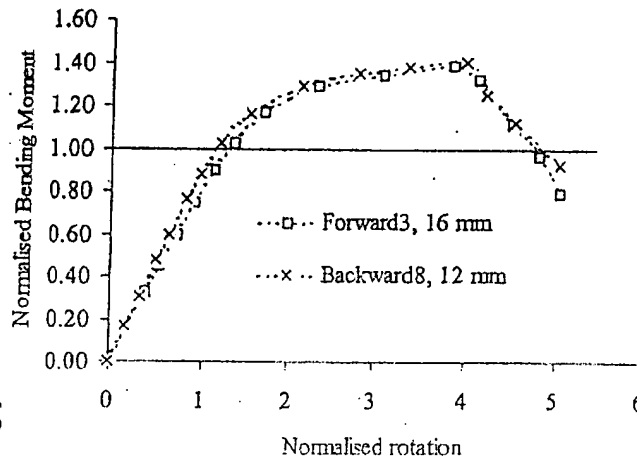


FIG. 26

Comparison between "Forward3" and "Backward8", 150×50×5 specimens

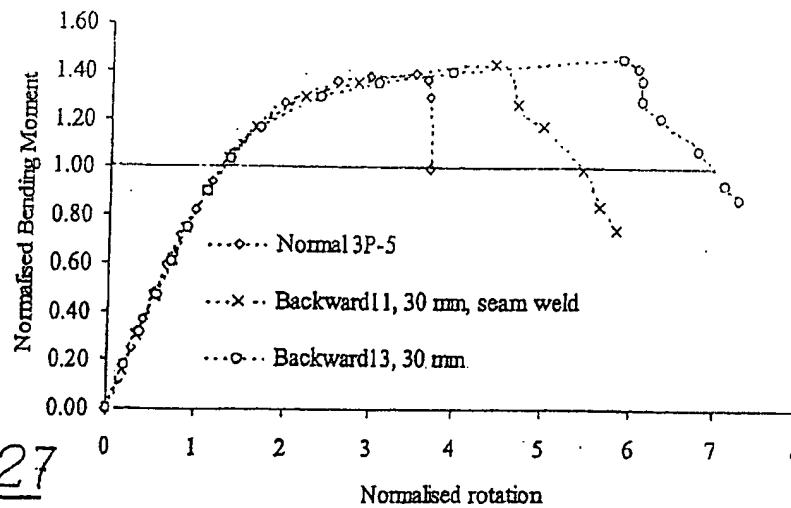
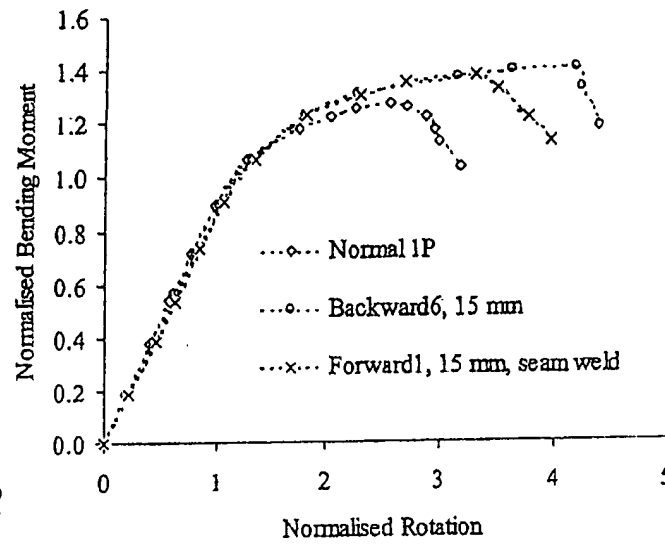


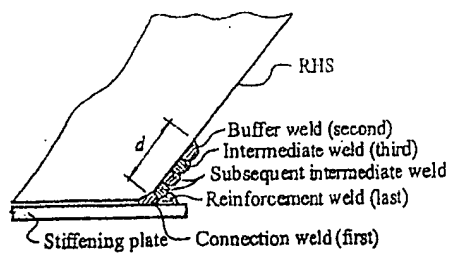
FIG. 27

Comparison between 150×50×5 specimens with and without seam weld

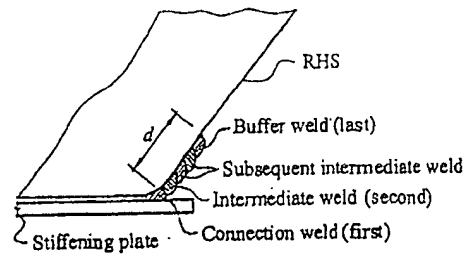


Comparison between  $150 \times 50 \times 4$  specimens with and without seam weld

FIG. 34



(a) Backward bead deposit sequence



(b) Forward bead deposit sequence

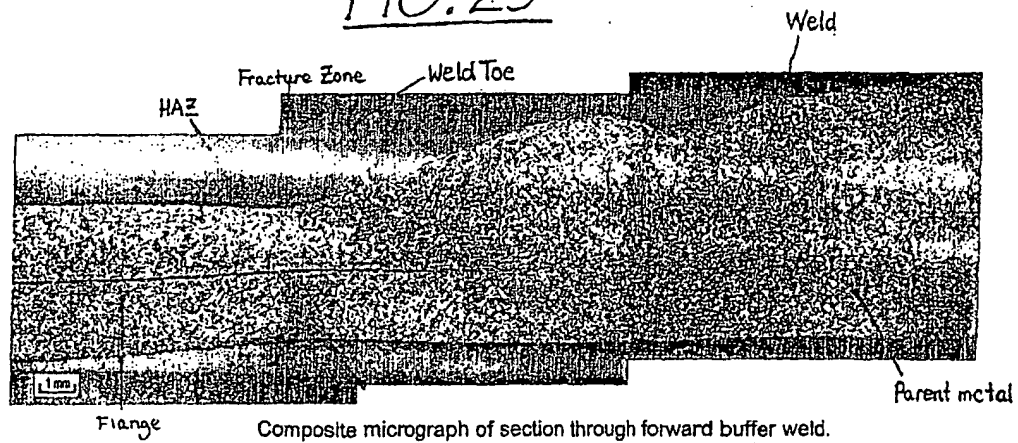
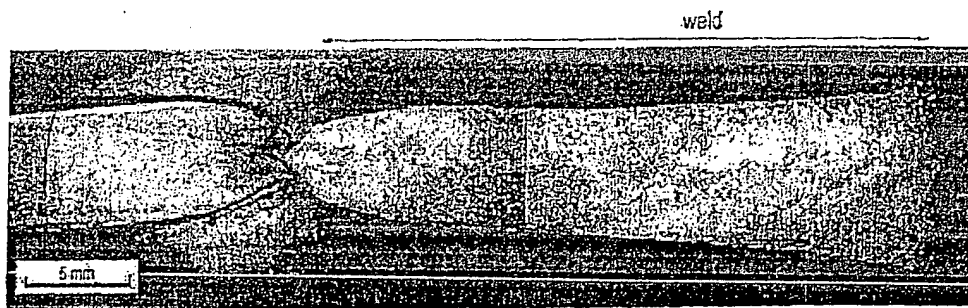
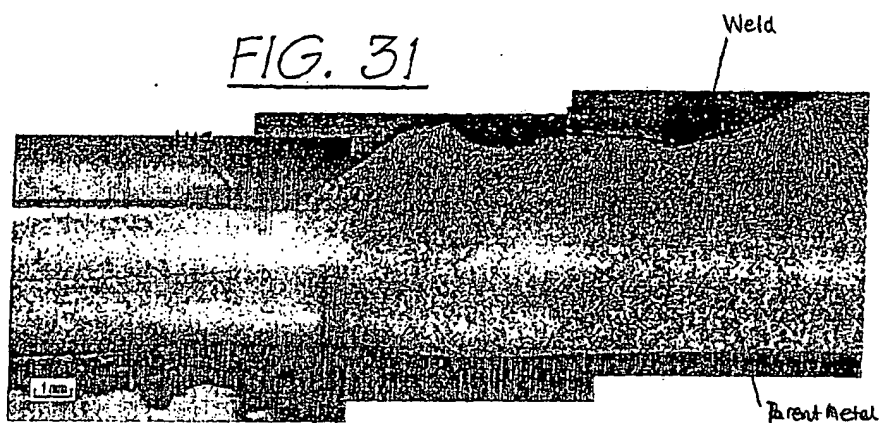
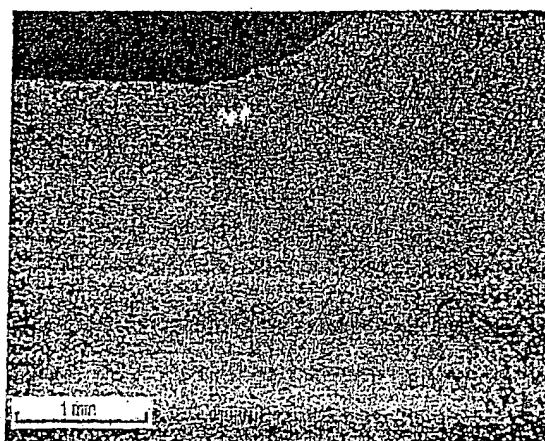
FIG. 29FIG. 30

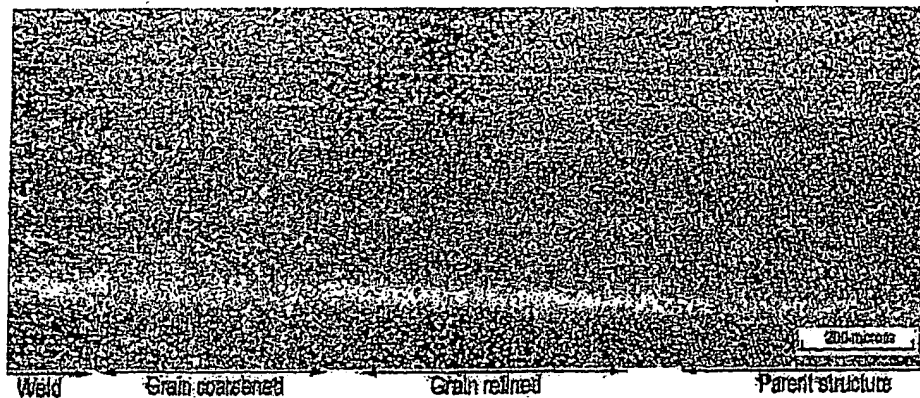
FIG. 31

Composite micrograph of section through backward buffer weld

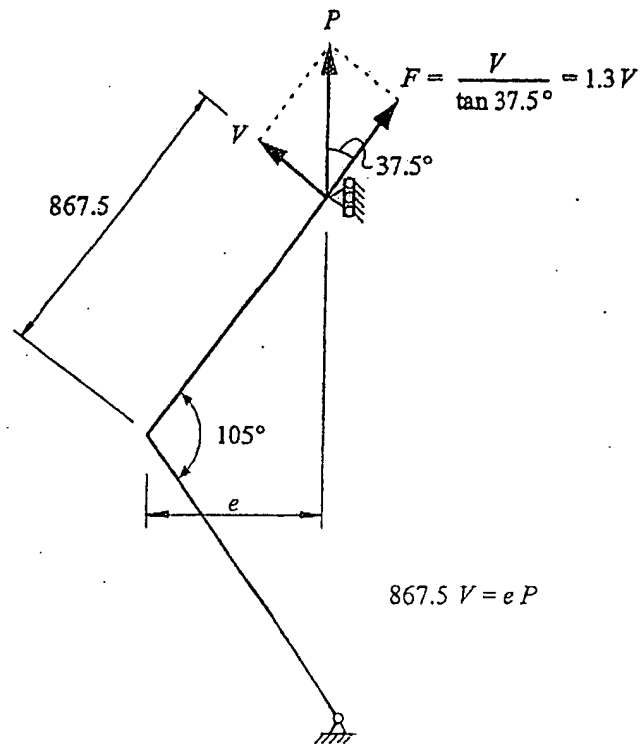
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FIG. 32

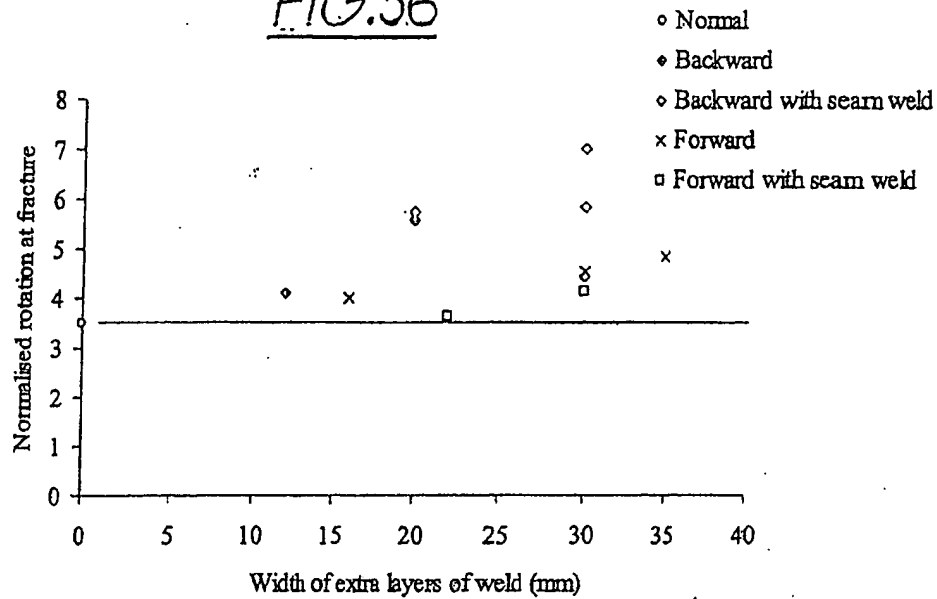
Toe of extreme edge of buffer weld indicating transition area

FIG. 33

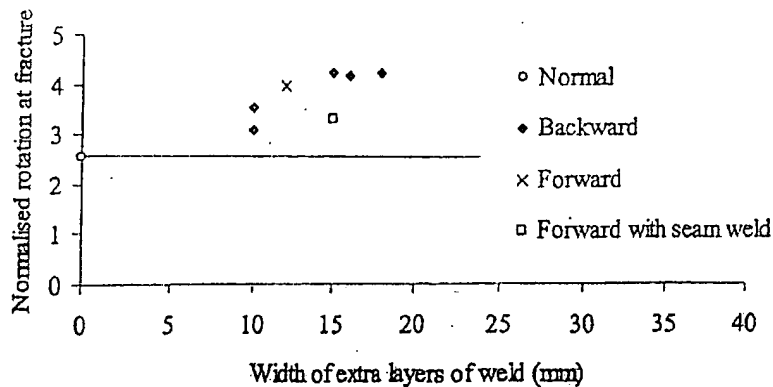
Transition through HAZ from weld metal to parent metal.

FIG. 35

Schematic diagram of a knee joint specimen

FIG.36

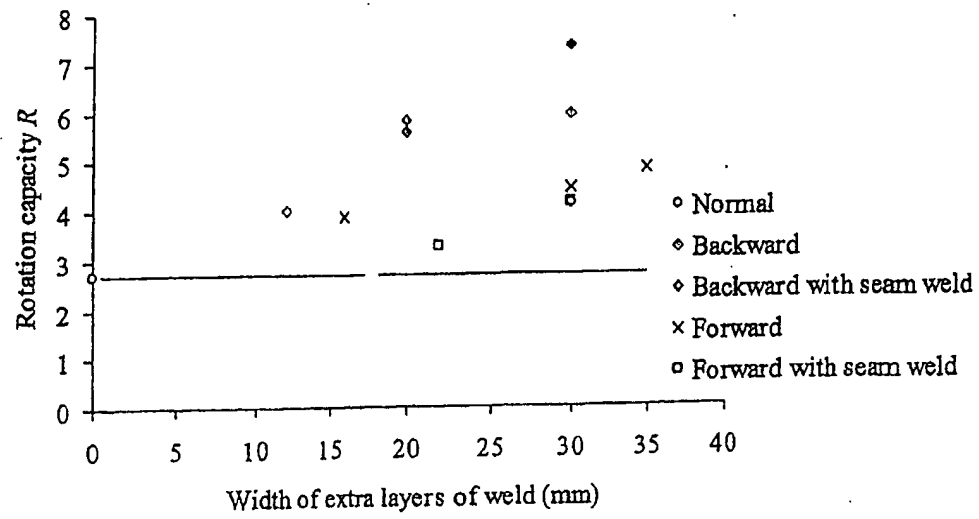
Normalised rotations at fracture of  $150 \times 50 \times 5$  specimens  
 (Effects of various parameters on the rotation capacities of 5-mm specimens)

FIG.37

(Effects of various parameters on the rotation capacities of 4-mm specimens)

Normalised rotations at fracture of  $150 \times 50 \times 4$  specimens



FIG. 38